<Session 4: Biomedical Application>The Study of Measurement In The View Point of Human's Interest

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The Study of Measurement In The View Point of Human's Interest

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Abstract

Humans get most of the information from the vision. And humans have the habit of turning a face to the interested direction. Getting to know the interesting view point of human can use for various fields, such as medical science, education, and economy. We developed the equipment which is interlocked with a motion of a face and controls the direction of a camera. A point of feeling interest can be quantified in analysing image and direction of a face. We succeeded at getting the quantification of the interest in extensive, until now we are impossible by the eye camera.

***Keywords**: point of interest,*

Introduction

Human gets most of the information from the vision. Everyone gaze at the point which got an interested in their view. It is very important knowledge to know the interesting view point of human. It can use for help us the many fields, medical science, education, economy and so on. For example, it helps the care worker in the hospital, who communicated with the speech impediment patient. And for physically handicapped and elderly people care. That case was using eye-camera until studies. However, we knew that there was interest point on front of the face in many cases. In this study, we got to know the interest point in the direction of the face.And we succeeded that get to information the interesting points from the movement of the head. We had experiment the method of interlocking a motion of a head and a camera

An experimental subject installed sensors and head mount display on a head. And the head motion is measured two directions by sensors. (Face swing left to right, look up to look down) Moreover, the camera sets in the place away from an experimental subject. And camera moves same angles and the direction with a subject. The experimental subject was watching the camera image from the head mounted display. We measure the head movement that can understand the interesting point from an experiment subject view.

A camera install on the multi-copter. The multi-copter can make quite free flight trajectory. It can placed camera on the free position in space. An experimental chooses the interest point of view from the image. And it shows on the center of the display by moving the head. We succeeded to get the interest points of view from the head motion of the experimental subject. It can plot on a map (on display) in real time. And it can quantify interest point of view.

Relation between interest and face direction

People obtain the about 80% information from eyes. The function of a look can be classified into three sections.

(1) "expression function". Expression function conveys feeling and intention to other people.

(2) "regulating function". It adjusts initiative in conversation. The expression function and the regulating function used for communicating in almost case.

For example, it can help for us share our feeling by eyes. When two men see the same object, we can guess the intention each other and try to sharing information. And we can understand the interest point of partner from each eye.

(3) "information catching function." Eye checks information around. This study, we think that to get information from vision is not only a motion of eye but also action of the head and body. And it is given us influence of the interest.

Human senses the danger by visual information when walking or driving a car. And they can avoid damaging by the danger .

We can get the information by the audition, too. When we are accosted, we engender reaction to the voice. Face turn to the sound localization. Our face turns to the sound source when hearing the explosion sound. "Turn the face" is order to carry out a situation check.

Based on these fact, human turn their face to the direction for interest. It is notably to the direction of concentrative intention. Head turns in unconsciously when human have interest point in the vision.

We postulated that interest point focus to point of vision. If I get the point data which is interested in experiment area and it can evaluate the nonnumeric concept of interest by measuring point of vision.

Methods

①Measurement of direction of a face

Face motion is measured in order to understand human's interest. Human's interest concentrate to view point when they meet the interest things. As the result, their face is looked at the front against the target point. Moreover, People easy to understand the image of the center than the outer.

An experimental subject is installed sensors and head mount display on the head. The sensor is measured two direction of the head motion. (Fig.1)

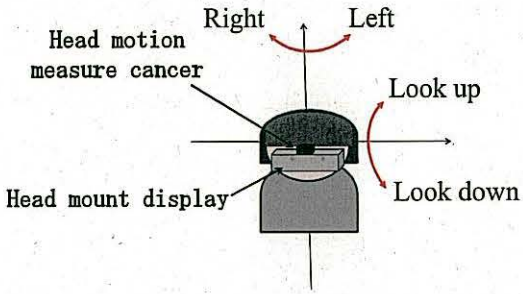


Fig.1 head direction measurement system and head mount display

An experimental subject watches the image by head mount display. When he turns the direction of the head, the image moves the same direction in a head mount display, too. And he is provided the consecutive images.

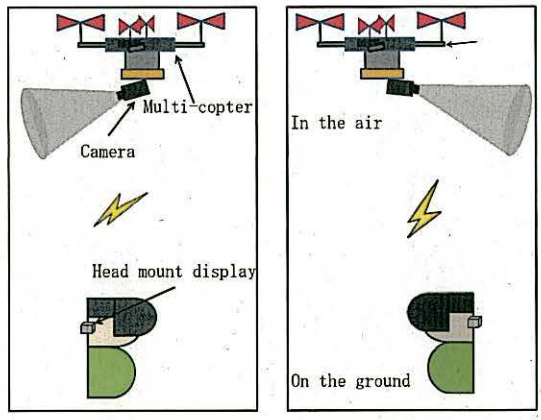
②Telemetering

Every Experimental subjects can experience the same course, because we make the constant environment.

An experimental subject stay at a directed position and get images from a head mounted display.

The image is offered by the camera. It installed on the multi-copter.

Multi-copter can fly the same route always because it programed flight trajectory before the experiment. It can provide every experimental subject to the same area information. It shows the system diagram Fig.3



(a) turn to left side (b)turn to right side

Fig.2 Telemeter system

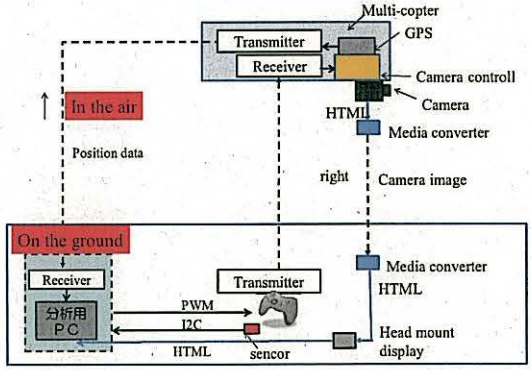


Fig. 3 system diagram

Experiment

We developed the "The face interesting view point search system". See Fig.4, the multi-copter is developed for this study. And Fig.5, in flight test. The multi-copter flied fixed test root and acquisition data. It flight about 20 minutes around flight area.

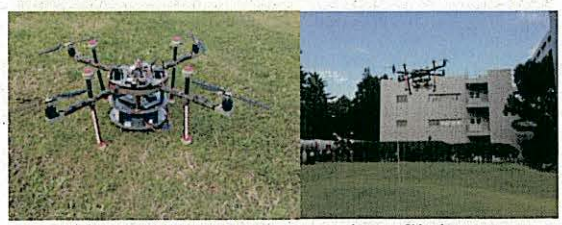


Fig.4 multi-copter Fig.5 flight test

Results

We could measure quantify interesting point from an experimental subject, and plot "interesting point" on a map (on display) in real time. We were able to know the shade of interesting test area. We could understand the interest statistical processing.